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INDUSTRIAL DEVELOPMENT AND COOPERATION ACTIVITIES: INTERNATIONAL COOPERATION IN INDUSTRIAL INVESTMENT AND TECHNOLOGY, INCLUDING COOPERATION AMONG DEVELOPING COUNTRIES

Development and transfer of technology

Report by the Director-General

Summary

Reports on the implementation of decision IDB.13/Dec.4, and updates information contained in chapter II of document GC.6/5-IDB.13/12.

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Introduction

1. The Board in its decision IDB.11/Dec.20 and the General Conference in its resolution GC.5/Res.3 requested the Director-General to promote certain options in the implementation of UNIDO activities on development and transfer of technology, to continue his efforts to monitor and evaluate new and emerging technologies that might be beneficial to the developing countries, and to examine constraints in the access to and transfer of technology to developing countries, with a view to identifying remedies to them through cooperation with other relevant organizations. The Conference also requested the Director-General to provide information services to industry to facilitate the widest possible access of developing countries to technological information on industrial subsectors and strengthen the functions of the Industrial and Technological Information Bank accordingly; and to report on the implementation of resolution GC.5/Res.3 through the Board to the Conference at its sixth session. The report of the Director-General (GC.6/5-IDB.13/12, chap.II) was presented to the Board at its thirteenth session. In its decision IDB.13/Dec.4, the Board addressed further requests to the Director-General in the continued implementation of UNIDO activities on development and transfer of technology, including a report thereon to the Conference at its sixth session. The present text responds to that request and provides information on developments that have occurred since the issuance of document GC.6/5.

I. INCREASE OF TECHNOLOGY FLOWS

2. UNIDO has evolved a strategy giving central focus to activities leading to the strengthening, integration and promotion of innovation and technology flows to developing countries. This implies the building up of the internal capability within enterprises for effective, adequate and continued application of technology for sustained competitiveness while at the same time creating an environment conducive to technology innovation and access to international technology flows. It also implies the need to make the demand for technology at the plant level conscious and explicit.

3. Assistance in identifying technological innovation needs for sustainable competitiveness is one of the key elements of the UNIDO strategy. This involves for instance, guidance in the technological diagnosis of competitive position of firms, identification of critical technology choices and evolution of their technology strategy. At the institutional level, it includes support for technology management centres and the establishment of new R and D centres or the revitalization of such centres so that they can play an active role in the process of technology selection, adaptation and innovation towards increased competitiveness.

4. Special attention is given to the promotion of enterprise-to-enterprise technology partnerships through the Techmart programme. InTechmart (Investment and Technology Market) is a recent development that combines in a Techmart activity, information, technological and investment considerations of business operations. This new concept was successfully implemented in the India InTechmart that took place at New Delhi, India, from 24 to 27 March 1995, and which reaffirmed the effectiveness of the programme, in its modified version, in providing project promoters, investors, technology sellers and buyers and research and development institutions with a unique setting for the conclusion of technology and joint venture agreements. The success of this event has led to requests for the same approach from India again (for 1996) and Indonesia.

5. A Techmart was held in Viet Nam in 1994, and another will take place at Lusaka, Zambia, for the Common Market for Eastern and Southern Africa in October 1995. Additional features deriving from existing UNID services are constantly being introduced in Techmart events to improve the quality of advisory and other services, feasibility studies, technology transfer negotiation workshops and technology status report preparation for a particular sector in a given country, as well as follow-up surveys with foreign and national participants. Special technological aspects being promoted include environmental technology (Entechmart) and solar energy (Suntechmart). The demand for this type of activity has been significant, with requests received from Brazil, China, Mexico, Namibia, Pakistan, Slovakia, Thailand and Venezuela. However, response to these requests is constrained by limited staff resources.

6. With regard to facilitating effective application of technology in developing countries, UNIDO is involved in a number of activities. At the International Textile and Garment Conference (Brazil, July 1995), UNIDO presented state-of-the-art technologies now being applied in the textile and garment industry, as well as quality control and environmental protection in the production of textiles. Another area being addressed is the chlorine-free production of straw pulp in China and the improvement to international standards of the quality of jute pulp in India. A workshop was also held on environmental management for pulp and paper production in Slovakia in April 1995. Within the framework of implementing the Montreal Protocol, assistance is being rendered to some 30 countries, e.g. in the Islamic Republic of Iran in the conversion of domestic refrigerator production plants that involved the training of 10 Iranian experts in Germany. Technicians from six African countries

(Benin, Congo, Kenya, Nigeria, Uganda and Zambia) were trained in designing, manufacturing and testing hydraulic maintenance presses, enabling them to manufacture the prototypes they designed in their respective countries.

7. Sectorally-focused technology transfer projects currently under implementation also lend assistance in the effective application of and increased flows of technology to developing countries. Examples include: technology selection for black liquor recovery (Egypt); in the pharmaceutical industry, biotechnological treatment of wastes (Jordan); technology for catalysts used in petrochemicals and the fertilizer industry, and energy transport vessel design and construction for coal transport (China); introduction of a new technology involving utilization of nile perch skin for production of fish skin leather in lieu of endangered species skin (African countries).

8. Other technology transfer activities comprise: building materials technology for non-fired stabilized soil blocks (Cameroon); modern technologies for marble quarrying and processing (Brazil, India, Viet Nam); technologies for manufacture of pigments using local non-metallic mineral resources (Mongolia); introduction of prefabricated timber-framed wall elements and trussed rafters in emergency shelter construction (Croatia); secondary treatment of effluents in fish processing and organic material recovery (Chile); modern industrial fan and blower design for local production, leading to energy savings of 30 to 40 per cent (Philippines).

II. DEVELOPMENT AND USE OF INDIGENOUS SCIENTIFIC AND TECHNICAL CAPACITY

9. A UNIDO-developed negotiations training package uses the recently-completed Manual on Technology Transfer Negotiations[1] as the core material. Addressed to institutional and professional instructors for use in organizing or conducting training courses on technology acquisition and negotiation, this package is a key element in the UNIDO product-service concept for its capacity-building programme in technology acquisition and negotiation. A large-scale capacity-building programme is currently under implementation in Brazil, while elements of a similar programme are being introduced in Arab countries and implemented in Africa under a subregional programme.

10. Under five large-scale training programmes for women entrepreneurs currently under UNIDO implementation, businesswomen in Botswana, Central America, Gambia, United Republic of Tanzania and Viet Nam are provided with entrepreneurial awareness, management skills and technical knowledge in establishing and running viable small-scale units in the food-processing sector. Technology choice and technical aspects relating to the commercial production of food comprise one of the main programme components.

11. Increasing emphasis is being placed on revitalization and strengthening of industry technology research institutes in developing countries. In 1995, UNIDO implemented a programme in Arab countries on this subject in cooperation with the United Nations Economic and Social Commission for Western Asia (ESCWA). At present, UNIDO is also undertaking a programme on the revitalization and privatization of the Pakistan Council of Scientific and Industrial Research which will strengthen linkages between the Council's industrial R and D institutes and Pakistani industry. Preparatory work was also undertaken leading to a programme on revitalization of R and D institutes in Africa. Within the framework of a large private sector development and capability-building project, UNIDO has initiated activities leading to a programme to assist the Council for Scientific and Industrial Research of Ghana in the restructuring of its R and D institutes, including the research results of commercialization.

12. In addition to the specific activities on revitalization of R and D institutes, UNIDO monitors and evaluates current trends in the whole industrial innovation process and the linkages between the enterprise, the scientific and technological community and the market place.

13. As a follow-up to a technical cooperation project on training and biotechnology transfer projects on the application of small bioindustries development funded by the Carl Duisberg Gesellschaft (CDG) and incorporated into UNIDO biotechnology programmes, an international symposium on development of small and medium enterprises for biotechnology commercialization in developing countries (sponsored by UNIDO and CDG) was held from 24 to 28 July 1995. In November 1995, this will be followed up by a round-table meeting to formulate a viable and active Philippine biotechnology business association. The project involved developing a model to strengthen local technology institutions, research and development capabilities and technology transfer from a central quality control and training centre, which included resource mobilization through networking arrangements to make them self reliant within a few years. The Quality Control and Training Centre at the University of the Philippines at Los Baños may be used as a prototype in new UNIDO initiatives in biotechnology transfer and commercialization in developing

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[1] The training package will be on exhibit at the General Conference.

countries by including other biotechnologies such as microbial fertilizers, various food fermentations, bioremediations and biotransformations.

14. Assistance was provided to Hungary in the development of good manufacturing practices guidelines for the whole food industry. These guidelines provide the Hungarian food industry with practical advice on food production technologies that conform with legislative requirements, are safe for the consumer, meet quality standards and are efficient.

III. TECHNOLOGY MANAGEMENT

15. UNIDO is implementing and developing a programme to build and strengthen capacity in developing countries to integrate technology management techniques in their national innovation systems. Activities promote awareness-building and education and cover the different issues of technology management, taking into consideration the technology policy and strategy of government, technological strategic planning of industry and enterprise-level technology management.

16. One example of awareness-building is the project "100 innovative enterprises in Latin America and the Caribbean". The main objective of the project is to identify the critical success factors of the most innovative enterprises in the region and the key managerial characteristics that allowed these enterprises to be competitive in international markets. As a result of the research work of this project, the innovative enterprises will be identified and rewarded and information disseminated on the innovation capacity and experience of successful Latin American enterprises. This exercise will eventually lead to the formulation of policies and strategies to motivate regional industry to further innovate and enhance its competitiveness.

17. An expert group meeting to discuss new and emerging issues on technology policy and management for competitiveness and the role of innovation systems in developing countries will take place by the end of 1995. At this meeting, the main trends in the changing global economic and technological framework will be analysed and opportunities and challenges to competitive industrialization and sustainable development in developing countries will be evaluated. The aim of the meeting is to identify a strategic agenda for UNIDO action on industrial technology policy. UNIDO has also identified and is in the process of negotiating and formulating technical cooperation programmes on the development of national innovation systems in a number of countries, such as Colombia, Ecuador and Ethiopia.

18. Education in technology management is being promoted through seminars, group training and workshops. In April 1995, UNIDO, in cooperation with the Government of Japan, organized a training seminar on technology management and industrial development with participants from India, Indonesia and the Philippines. Training covered basic concepts of technology management and industrial development, the role of flexible production systems and quality control. Emphasis was on technological issues such as policy, productivity, transfer of technology, human resource development and marketing. The development of teaching materials and manuals on technology management techniques is also a basic element of the UNIDO programme in this area. In April 1995, a national workshop on technology management for enterprises was held at Nairobi, Kenya, to sensitize and assist selected Kenyan enterprises in the introduction of modern technology management techniques and instruments in their entrepreneurial undertakings.

19. In the area of new and emerging technologies, national programmes and projects on promotion of innovation, commercialization of R and D and business development are being developed and implemented. Activities aim at strengthening the technological capacity of recipient countries in monitoring and assessment of innovations and at the development of a mechanism for their marketing and commercialization, including industrial application of high technology spin-offs. A national programme has been developed for China to promote technological innovations in large-scale state companies to enhance competitiveness. The programme will be implemented by UNIDO within the framework of a national technology development initiative. Also in China, UNIDO, in cooperation with the United Nations Educational, Scientific and Cultural Organization (UNESCO), has undertaken technical support services at the programme level on management of technological change in an evolving market economy. Preparations have begun on a national project on integrated support to the Russian Federation in promoting innovations. Work has also started on an integrated transsectoral programme on management of technological change in the materials sectors of industry, to be presented at the Global Forum on Industry at New Delhi, India, in October 1995.

IV. MONITORING NEW AND EMERGING TECHNOLOGIES

20. Through its Technology Trends and Monitor series, UNIDO keeps developing countries informed of developments and trends in areas of new and advanced technologies and promotes their commercial application as a means of improving international competitiveness. In addition to a new monitor covering high technology spin-offs published in 1995, a new series on advanced materials technology was released in response to recent

changes across virtually all high technology fields. This publication aims at assisting government policy makers, senior managers in industry and scientists in identifying strategic functions for new materials in industrial and economic competitiveness. Newsletters on Agenda 21, the Lactic Acid Bacteria Network and the Mushroom Biotechnology Network were also issued.

21. Assistance is being provided to developing countries for the establishment of national capabilities for the monitoring and evaluation of new technologies as in a project implemented in Lebanon in 1995. An action programme derived from the UNIDO meeting on cooperation in technology monitoring in developing countries at New Delhi, India, in November 1994, will produce the following outputs: (a) a biennial technology trend report that will present technology monitoring from a developing country perspective; (b) an international network for technology monitoring on the basis of eventual on-line access to multi-country systems; and (c) a technology monitoring manual covering guidelines, case studies, sources for monitoring and country examples and giving particular attention to enterprise users.

22. In line with the recommendations of the United Nations Conference on Environment and Development (UNCED) to strengthen cooperation and increase international cooperation in the field of chemical safety, the inter-organization programme for the sound management of chemicals was established in 1995 by a number of United Nations organizations as well as the Organization for Economic Cooperation and Development with the aim of improving coordination of policies and activities in the sound management of chemicals. Since chemical industries is a main UNIDO thrust area, a strong portfolio of programmes and projects covering industrial aspects of chemical safety was developed and is being implemented. Among the areas covered by these programmes are capacity-building in ecotoxicology and environment monitoring, risk reduction in development of agrochemicals, integrated safety in chemical production and petrochemical complexes, hospital waste management, biodegradation of persistent organic pollutants, good manufacturing practices in pharmaceutical and biotechnological industries.

V. IDENTIFYING OPPORTUNITIES AND CONSTRAINTS IN THE ACCESS TO TECHNOLOGY BY DEVELOPING COUNTRIES

23. UNIDO takes advantage of expert meetings, workshops and similar forums to analyse technology transfer and development features and trends; identify policy issues arising for Governments from such developments; and derive new opportunities for international cooperation. Participation in inter-agency meetings and regular contacts with other international organizations also provide the opportunity for joint analyses and exchange of views on the subject as well as for coordinating appropriate actions.

24. UNIDO has commissioned a study to review and analyse the core provisions of the relevant Uruguay Round Agreements and how they affect the flow and diffusion of technology to developing countries, including the terms and conditions of such flows, and the building up of domestic technological capabilities, R and D and inventive and innovative potential. The end result will be policy and strategy recommendations for consideration by developing countries in order to benefit from the opportunities and cope with the challenges brought about by the Agreements.

VI. INFORMATION SERVICES

25. UNIDO continued its efforts to develop and enhance the access of Member States to information sources covering industrial technologies and investment opportunities; to support the Industrial and Technological Information Bank (INTIB) regional, national and sectoral networks — with a focus on strengthening regional focal points through advisory and inquiry/referral services and provision of UNIDO/INTIB information resources and expanding INTIB national focal points to national information systems. One of these efforts comprises developing and enhancing computer-linked regional networks, while various technical cooperation approaches were developed to provide further support to national focal points.

26. In cooperation with the African Regional Centre for Technology, the regional project for Africa and Arab countries to install INTIB standard database applications and to develop the African network is under implementation. Cooperation was strengthened with the Asia and Pacific Centre for Transfer of Technology as an INTIB regional focal point. In Eastern Europe and the Newly Independent States of the former Soviet Union, a regional workshop on industrial and business information services on enhanced computer links to INTIB regional networks helped to integrate those networks with Investment Promotion Services and subcontracting exchanges (Budapest, Hungary, October 1994). A project for upgrading information services in the region to provide industry and business information for small- and medium-scale enterprises is under implementation.

27. In Sri Lanka, the ITMIN (Industry, Technology and Market Information Network) project is under implementation, with similar projects under consideration for

Bangladesh, Indonesia, Thailand and Viet Nam. Under trust fund arrangements, ITMIN-type projects are being developed for Bolivia, Colombia and Peru.

28. Efforts continued in improving the connection of INTIB focal points to the Internet global communications network and knowledge base. In addition to electronic messaging, this includes access to computerized resources. Projects to provide necessary training in the use of the Internet and other global networks in order to gain access to business, technology and investment information were developed and implemented. The first one was organized in Moscow, from 22 to 26 May 1995, for countries of the Commonwealth of Independent States. In September 1995, the training will be provided to representatives from Central and Eastern Europe at Prague, Czech Republic, for Latin America and the Caribbean at Bogota, Colombia and for selected African countries at Pretoria, South Africa, in the first quarter of 1996. Furthermore, guidelines on information resource management at the enterprise level and for organization of information services and access to business information using Internet were prepared and disseminated to INTIB network members.

29. The Biosafety Information Network and Advisory Service (BINAS) of UNIDO is a versatile vehicle for information and knowledgeable advice on biosafety regulatory issues for regulators, scientists and industry. Available on the Internet since December 1994, its databases on regulations/guidelines, releases of transgenic organisms, experts in biosafety, and biosafety-related bibliography have a proven appeal for users of biosafety data world-wide. The database spectrum is being expanded to include technology-impact assessments and intellectual property rights. Aware of the quality of this information service, other organizations have expressed their willingness to cooperate with BINAS. The Organisation for Economic Cooperation and Development database BIOTRACK has already been included and BINAS recently entered into a collaborative relationship with the Agency for Biosafety Research and Assessment of Technology Impacts of the Swiss National Science Foundation.

30. The input of UNIDO to the Asian Biotechnology and Biodiversity subprogramme of the Farmer-Centred Agricultural Resource Management programme (FARM) has been the establishment of a regional bio-informatics network that offers information on relevant biotechnologies to a wide range of users, from researchers to farmers. In November 1995, under the FARM subprogramme, a regional training workshop will be held at Bangkok, Thailand, co-sponsored by the International Centre for Genetic Engineering and Biotechnology and the United Nations Environment Programme in collaboration with the Crawford Fund (Australia). The workshop will deal with the use of rDNA technologies in biodiversity and biosafety.

VII. ACTION REQUIRED OF THE CONFERENCE

31. The Conference may wish to take note of the present document and provide guidance for follow-up action.